

The embodiments of the invention for which as exclusive privilege and property right is claimed are defined as follows:

1. A method for fracturing a rock formation next to a well bore using a frac pad fluid and collecting the fluid from the rock formation through the well bore, a portion of a bottom of the well bore having a sandpacked annulus therearound, the method for fracturing used for increasing oil and/or gas production from the rock formation, the steps comprising:

creating a first pressure gradient by controlling a fluid flow rate of the frac pad fluid flow upward through a portion of the well bore sandpacked annulus located above the top of a propagating tall frac hydraulic fracture, the first pressure gradient greater than an average gradient of the rock formation's frac-extension pressure;

creating a second pressure gradient by friction loss of the fluid flow rate of the frac pad fluid through combined parallel paths in the sandpacked annulus and the hydraulic fracture propagating outward and upward in the rock formation; and

creating a frac producing stress field in the rock formation and along a length of the sandpacked annulus by maneuvering an intersection of the first and second pressure gradients of the frac pad fluid.

2. The method as described in claim 1 further including a step of controlling a back pressure on a discharge of the frac pad fluid from the sandpacked annulus, thereby controlling the first pressure gradient to a desired value greater than the average gradient of the rock formation's frac-extension pressure for controlling the growth of the hydraulic fracture along the length of the sandpacked annulus.

3. The method as described in claim 2 wherein the step of controlling the rate of change of a back pressure on the discharge of the frac pad fluid from the sandpacked annulus to control the rate of growth of the hydraulic fracture along the sandpacked annulus and in a range of 1 to 2 feet frac growth per psi of annulus backpressure change.

4. The method as described in claim 1 further including a step of increasing the volume of frac pad fluid flowing through the combined parallel paths of the sandpacked annulus and through the hydraulic fracture for increasing the outward growth of the hydraulic fracture from an axis along the length of the sandpacked annulus.

5. The method as described in claim 4 wherein the step of increasing the volume of frac pad fluid increases the length perpendicular to a well bore axis of the hydraulic fracture in a range of 50 to 200 feet.

6. The method as described in claim 1 further including a step of increasing a volume rate of net frac fluid injection into the hydraulic fracture compared to a rate of change of annulus discharge back pressure controlling a rate of growth of the hydraulic fracture along the sandpacked annulus to thereby control a ratio of an average fracture length perpendicular to an axis of the sandpacked annulus when compared to the hydraulic fracture height and length along the axis of the sandpacked annulus.

7. The method as described in claim 1 further including a step of circulating a frac fluid with sand through the hydraulic fracture and discharging a portion of frac fluid without sand through the sandpacked annulus thereby building a frac sandpack in a portion of the hydraulic fracture adjacent the sandpacked annulus.

8. A method for fracturing a rock formation next to a well bore using a frac pad fluid and collecting the fluid from the rock formation through the well bore, the well bore vertical, horizontal and any angle between the vertical and horizontal, the method for fracturing used for increasing oil and/or gas production from the rock formation, the steps comprising:

- creating a well bore sandpacked annulus around a lower portion of a production casing at a bottom of the well bore;

- creating a first pressure gradient by controlling a fluid flow rate of the frac pad fluid through a portion of a well bore sandpacked annulus located above the top of a hydraulic fracture, the first pressure gradient significantly greater than an average gradient of the rock formation's frac-extension pressure;

- creating a second pressure gradient created by friction loss of the volume flow rate of the frac pad fluid flowing through combined parallel paths in the sandpacked annulus and the hydraulic fracture, the hydraulic fracture propagating outward and upward in the rock formation;

creating a linear sourced, cylindrical, stress field in the rock formation adjacent to a length of the sandpacked annulus by maneuvering an intersection of the first and second pressure gradients of the frac pad fluid to the desired frac-extension pressure; and

creating a hydraulic fracture in the cylindrical stress field in the rock formation with a fracture plane encompassing the axis of the linear sourced, cylindrical stress field surrounding the sandpacked annulus.

9. The method as described in claim 8 wherein the step of creating the well bore sandpacked annulus includes circulating sand laden water down the production casing and upward through an annulus next to the production casing for creating the sandpacked annulus between the production casing and an open hole well bore wall.

10. The method as described in claim 9 wherein the sand laden water develops a fluidized bed in the annulus capable of concentrating sand content therein.

11. The method described in claim 10 wherein the fluidized bed creates a sand concentration sufficient to create a continuous sandpacked annulus along a length of the annulus.

12. The method as described in claim 8 further including a step of controlling the rate of change of a back pressure on a discharge of the frac pad fluid from the sandpacked annulus, thereby controlling the first pressure gradient to reach a desired value greater than the rock formation's frac-extension pressure at progressively greater distances along the length of the sandpacked annulus and controlling the rate of growth of the hydraulic fracture along the length of the sandpacked annulus, the maximum growth of the hydraulic fracture being equal to the length of the sandpacked annulus around the production casing.

13. The method as described in claim 12 wherein the step of controlling the rate of change of a back pressure on the discharge of the frac pad fluid from the sandpacked annulus controls the rate of growth of the hydraulic fracture along the sandpacked annulus in a range of 1 to 2 feet of frac growth per psi of annulus backpressure changes.

14. The method as described in claim 8 further including a step of increasing the volume of frac pad fluid flowing through the sandpacked annulus and through the hydraulic fracture for increasing the outward growth of the hydraulic fracture from an axis along the length of the sandpacked annulus and perpendicular thereto.

15. The method as described in claim 14 wherein the step of increasing the volume of frac pad fluid increases the propagation of the hydraulic fracture outwardly in a range of 50 to 200 feet.

16. The method as described in claim 12 including the step of controlling the volume rate of net frac fluid injection into the hydraulic fracture compared to the rate of change of discharge back pressure from the sandpacked annulus to thereby control the ratio of an average frac length perpendicular to an axis of the sandpacked annulus when compared to the hydraulic fracture height and length along the axis of the sandpacked annulus.

17. The method as described in claim 8 further including a step of circulating a frac pad fluid with sand through the hydraulic fracture and discharging a portion of a frac fluid without sand through the sandpacked annulus thereby building a frac sand pack in a portion of the hydraulic fracture adjacent to the sandpacked annulus.

18. A method for fracturing a rock formation next to a well bore using a frac pad fluid and collecting the fluid from the rock formation through the well bore, the well bore vertical, horizontal and any angle between the vertical and horizontal, the method for fracturing used for increasing oil and/or gas production from the rock formation, the steps comprising:

creating a well bore sandpacked annulus in a lower open area annulus around a lower portion of a production casing at a bottom of the well bore, an upper portion of the production casing surrounded by an outer casing, an upper open area annulus disposed between the production casing and the outer casing, the sandpacked annulus disposed in the lower open area annulus between the production casing and a well bore wall, the sandpacked annulus created by

circulating sand laden water down the production casing and up the lower open area annulus creating a fluidized sandbed to concentrate a sand content in a range of 50 to 65 %, thereby creating a continuous sandpack over a length of the lower annulus to be frac completed for production;

creating a first pressure gradient by controlling a fluid flow rate of the frac pad fluid through a portion of a well bore sandpacked annulus located above the top of a hydraulic fracture, the first pressure gradient significantly greater than an average frac extension pressure gradient of the rock formation; the sandpacked annulus disposed over the lower portion of the production casing and between the bottom of the production casing and the bottom of the outer casing

creating a second pressure gradient created by friction loss of the volume flow rate of the frac pad fluid flowing through combined parallel paths in the sandpacked annulus and the hydraulic fracture, the hydraulic fracture propagating outward and upward in the rock formation adjacent the sandpacked annulus;

creating a linear sourced, cylindrical, stress field in the rock formation and along a length of the sandpacked annulus by maneuvering an intersection of the first and second pressure gradients of the frac pad fluid to create a cylindrical stress in the rock formation thereby creating and propogating a linear sourced hydraulic fracture along an axis of the sandpacked annulus; and

circulating a frac fluid with sand down the production casing and through the hydraulic fracture and discharging a portion of a frac fluid without sand through the sandpacked annulus thereby building a frac sandpack in the portion of the hydraulic fracture next to the sandpaced annulus.

19. The method as described in claim 18 further including a step of controlling a back pressure on a discharge of the frac pad fluid received through the open area annulus, thereby controlling the first pressure gradient to a desired value above the average gradient of the rock formation's frac-extension pressure and controlling the growth of the hydraulic fracture along the length of the sandpacked annulus, the maximum growth of the hydraulic fracture being equal to the length of the sandpacked annulus around the production casing, the rate of change of the back pressure on the discharge of the frac pad fluid from the sandpacked annulus controlling the rate of growth of the hydraulic fracture in a range of 1 to 2 feet of fracture growth per psi of back pressure change.

20. The method as described in claim 18 further including a step of increasing the volume of frac pad fluid flowing through the sandpacked annulus and through the hydraulic fracture for increasing the outward growth of the hydraulic fracture from an axis along the length of the sandpacked annulus and perpendicular thereto, the volume of frac pad fluid increasing the propagation of the hydraulic fracture outwardly and at right angles to an axis of the sandpacked annulus, the propagation of the hydraulic fracture in a range of 50 to 200 feet.